If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match.
The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the ESSHQ Procedures Coordinator, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

15.5.13 Hypot Test Procedure for Dielectric-Coated Vacuum Components

(Vacuum Group Procedure VA-008.18.1.14)

Note: This document was formerly a C-A Group Procedure. The content of the group procedure was reviewed by the Technical Supervisor. All approvals and/or issue dates of the original group procedure are maintained for present use.

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: ***Signature on File*** _____
Collider-Accelerator Department Chairman

Date

L. Smart

Vacuum Group Procedure VA-008.18.1.13
Original Issue Date: 01/25/06
Revision 01

1. Purpose

1.1 To provide instruction for properly trained individuals in the C-AD Vacuum Group to conduct safe high potential voltage testing of dielectric coatings. This procedure is limited to test voltages less than 6000 V dc.

2. Responsibilities

2.1 It is the responsibility of the Vacuum Group Technical Supervisor and Cognizant Engineer to train Vacuum technicians in this procedure. It is the responsibility of the cognizant engineer to establish the test parameters including voltage hold-off, spacing, mechanical considerations, and system configuration, and to carefully inspect the test setup prior to conducting the test. It is the responsibility of the personnel conducting the test to record the test results as required.

3. Prerequisites

3.1 Personnel performing this procedure shall have current training in LOTO (Authorized), Electrical Safety, and Electrical Safe Work Practices.

3.2 This procedure is limited to the use of an Associated Research Portable DC Hypot Model 5220A or equivalent.

3.3 Access to the Hypot test area shall be restricted with appropriate postings and boundaries. A barrier shall be placed so that the operators are a minimum distance of one (1) foot away from the high voltage components.

3.4 All of the equipment used shall be carefully inspected prior to testing. The Hypot shall be calibrated. Do not use the Hypot if it is out of calibration.

4. Precautions

4.1 The voltages used in this procedure pose a Range C Electrical Hazard. The test voltage for this procedure is limited to less than 6000 V dc.

4.2 The electrical hazards are restricted to energized components. Effort should be used to expose as little high voltage area as possible.

4.3 Workers shall wear appropriate Personal Protective Equipment, including safety glasses.

4.4 The system shall have an overall safety ground. This ground shall be firmly attached by means of a non-insulated braid. The system shall have a ground stick attached to the safety ground.

4.5 There shall be two authorized workers present at all times during the Hypot testing. One worker shall be responsible for operating the Hypot controls. Both workers will be authorized and familiar with the approved procedures and emergency responses.

4.6 No work shall be performed "hot" (on energized parts). All work, e.g., connecting high voltage cables to the components being tested, shall be performed with the Hypot deenergized.

4.7 This procedure does not cover testing dielectric coatings by sweeping an energized or grounded component across a dielectric surface to find defects.

5. Procedure

5.1 Measure the resistance of the component to ground with an ohmmeter. The resistance must be greater than 20 Megohms to continue this procedure. If the resistance is less than 20 Megohms, notify your supervisor and the cognizant engineer.

5.2 Secure the test area and notify affected workers. Barriers must be in place prior to conducting the test. The barrier must keep workers at least one (1) foot from the component under test.

5.3 Verify that the ground cables for the Hypot and test piece are properly connected to a known good electrical ground.

5.4 Set the Hypot control switches:

POWER: Off
GROUND: Metered
KILOVOLTS: Low
HIGH VOLTAGE CIRCUIT ENERGIZED (HV switch): Off

5.5 With the Hypot tester de-energized, connect the Hypot leads to the component under test per cognizant engineer.

5.6 Both workers shall be in position outside of the barrier and ready for the application of high voltage.

5.7 Turn the HV control knob to zero output and set current switches to correct settings.

5.8 Turn on the Hypot and slowly raise the voltage the correct setting, watching for signs of arcing. Signs of arcing include a sudden increase of current and corresponding reduction of voltage.

5.9 If visible flashing or arcing, audible snapping, crackling or popping is observed, the voltage must be turned off. Note the voltage and peak current at which the arcing occurs. Notify your supervisor and the cognizant engineer.

5.10 When the component under test reaches the desired voltage, maintain the voltage until the current stabilizes, approximately 60 seconds. Record the leakage current and test voltage on the appropriate data sheet.

Procedure For Hypot Testing Dielectric Coatings

5.11 Turn the HV control knob to zero, wait until the current meter indicates zero microamperes, turn the HV switch off, and disconnect the AC power.

5.12. Apply the ground stick to the test component. Leave the ground on the component for at least as long as the voltage was applied. Disconnect the item under test.

5.13. Remove barriers and notify affected workers that test is over.

6. Documentation

6.1 Appropriate logbook or record sheet.

7. References

7.1 None.

8. Attachments

8.1 None.